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Claims

1. A composition for making breathable films, the composition comprising:

5 (1) 20-50%, based on the weight of the total composition, a bimodal polyethylene composition, further comprising

(i-a) a first low molecular weight component, which is a homopolymer of ethylene or a copolymer of ethylene and one or more C₄ to C₁₀ alpha-olefins, having a melt flow rate, determined according to ISO 1133 at 190°C, MFR₂ of
10 50 to 500 g/10 min, preferably of 100 to 400 g/10 min and a density of 940 to 975 kg/m³, preferably 945 to 975 kg/m³, the first component being present in the bimodal polyethylene composition in an amount of 37 to 48% by weight,

(i-b) at least a second component, which is a copolymer of ethylene and one or more C₄ to C₁₀ alpha-olefins, having a higher molecular weight, a lower
15 melt flow rate and a lower density than the said first component, the second component being present in the bimodal polyethylene composition in an amount of 52 to 63% by weight, so that the said bimodal polyethylene composition has a melt flow rate, determined according to ISO 1133 at 190°C, MFR₂ in the range of 0.1 to 4.0 g/10 min, MFR₂₁ in the range of 15 to 200 g/10
20 min, and a density of 918 to 935 kg/m³,

(ii) 40-70%, based on the weight of the total composition, a particulate filler, and

(iii) 0-30%, based on the weight of the total composition, another olefin-based polymer.

25 2. The composition according to Claim 1, wherein the other olefin based polymer is selected from the group of homo- and copolymers propylene, 1-butene and 4-methyl-1-pentene.

30 3. The composition according to Claim 1 or 2, wherein the other olefin based polymer is a propylene homo- or copolymer, preferably a copolymer of propylene and ethylene.

4. The composition according to Claim 3, wherein the composition comprises of 5 to 20%, based on the weight of the total composition, of the said propylene polymer.

5. The composition according to Claim 1, wherein the content of the particulate filler is 55 to 70%.

6. A composition according to any one of the preceding claims, wherein the particulate filler is calcium carbonate.

7. The composition according to claim 1 wherein said bimodal polyethylene composition has the following properties (a) to (d):

(a) density from 918 to 935 kg/m³

(b) melt flow rate MFR₂ from 0.1 to 0.8 g/10 min;

(c) melt flow rate, determined according to ISO 1133 at 190°C, MFR₂₁ from 15 to 70 g/10 min;

(d) flow rate ratio MFR₂₁/MFR₂ from 60 to 120.

8. The composition according to Claim 7, wherein the bimodal polyethylene composition has:

(e) a weight average molecular weight (M_w) from 150000 to 300000 g/mol;

(f) a ratio of the weight average molecular weight to the number average molecular weight (M_w/M_n) from 7 to 30; and

(g) a content of alpha-olefin comonomer units of 2 to 5% by mole.

9. The composition according to any one of Claims 7 or 8, wherein the other olefin based polymer is a propylene homo- or copolymer, preferably a copolymer of propylene and ethylene.

10. The composition according to Claim 9, wherein the composition comprises of 5 to 20%, based on the weight of the total composition, of the said propylene

polymer.

11. The composition according to any one of Claims 7 or 8, wherein the content of the particulate filler is 55 to 70%.

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12. A composition according to any one of Claims 7 to 11, wherein the particulate filler is calcium carbonate.

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13. The use of the composition according to any one of Claims 1 to 12 for making films.

14. A breathable polymer film, which film comprises a composition according to any one of Claims 1 to 12.

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15. A film according to Claim 14 wherein the film has a water vapour transmission rate, measured using a Permatran W100K water vapour permeation analysis system, of more than 3000 g/m²/24 h, preferably more than 4000 g/m²/24 h.

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16. A film according to any one of Claims 14 to 15, wherein the film has a basis weight of less than 25 g/m².

17. A process for producing a breathable polymer film, comprising the steps of:
(A) providing into an extruder a composition according to any one of Claims 1 to 12

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(B) extruding the composition to a film
(C) stretching the film to produce a breathable film.

18. The process according to Claim 17, wherein the film is stretched with a stretching ratio of 3 to 10, preferably 4 to 7.

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19. The process according to any one of Claims 17 to 18, wherein the bimodal polyethylene composition has been produced by a process comprising the steps of:

- 5 (i) subjecting ethylene, hydrogen and optionally comonomers to a first polymerisation or copolymerisation reaction in the presence of the polymerisation catalyst in a first reaction zone or reactor to produce a first polymerisation product having a low molecular weight with a melt flow rate, determined according to ISO 1133 at 190°C, MFR₂ of 50 to 500 g/10 min, preferably of 100 to 400 g/10 min and a density of 940 to 975 kg/m³, preferably 945 to 975 kg/m³,
- 10 (ii) recovering the first polymerisation product from the first reaction zone,
(iii) feeding the first polymerisation product into a second reaction zone or reactor,
- (iv) feeding additional ethylene, comonomers and optionally hydrogen to the second reaction zone,
- 15 (v) subjecting additional ethylene and additional comonomer(s) and optionally hydrogen to the second reaction zone in the presence of the said polymerisation catalyst and the first polymerisation product,
- (vi) to produce a polymer composition comprising from 41 to 48% by weight of the low molecular weight polymer produced in step (i), and from 59 to 52% by weight of the high molecular weight component produced in step (v),
- 20 (vii) the composition having a melt flow rate, determined according to ISO 1133 at 190°C, in the range MFR₂ of 0.1 to 4.0 g/10 min, preferably 0.1 to 0.8 g/10 min and a density of 918 to 935 kg/m³, and
- (viii) recovering the combined polymerisation product from the second reaction zone.

- 25 20. The process according to Claim 19, wherein at least part of the volatile components of the reaction medium are evaporated and removed from the first polymerisation product before the said first polymerisation product is introduced into the second reaction zone or reactor.